



IB MYP YEAR 5  
ASSESSMENT TASK  
**A Broad-based Test**

Subject:	Y10 <i>Standard</i> Mathematics	Name : <del>Joshua</del> (Class)	Joshua Hui ( ) Y10 H
Assessment:	Broad-based Test		
Topics covered	Polynomials, Transformations (and transforming functions), Probability, Vectors, Matrices, Indices		
Date of assessment:	Thursday 16 <sup>th</sup> February 2012		

- This task assesses Criteria A and C;
- Time allowed – *one hour 40 minutes*;
- You must answer all the questions;
- Write your answers in the spaces provided;
- Show all of your working – not just the answer
- GDCs are allowed.

A = 3  
C = 2

Criterion A		
Levels	Task-Specific Rubric	Official IB Descriptors
0	The student does not reach a standard described by any of the descriptors given below.	
1-2	Students are reasonably successful with the Part A questions only. Any errors here are relatively minor.	The student <b>generally</b> makes appropriate deductions when solving <b>simple</b> problems in <b>familiar</b> contexts.
3-4	Students are successful with Part A questions. The only errors in part B questions are minor.	The student generally makes appropriate deductions when solving <b>more complex</b> problems in <b>familiar</b> contexts.
5-6	Students are successful with Part A and B questions. The only errors in part C questions are minor.	The student <b>generally</b> makes appropriate deductions when solving <b>challenging</b> problems in a <b>variety</b> of <b>familiar</b> contexts.
7-8	Students are successful with Part A, B and C questions. The only errors in part D questions are minor.	The student <b>consistently</b> makes appropriate deductions when solving <b>challenging</b> problems in a <b>variety</b> of contexts including <b>unfamiliar situations</b> .

Criterion C		
Levels	Task-Specific Rubric	Official IB Descriptors
0	The student does not reach a standard described by any of the descriptors given below.	
1-2	Very little working is shown, and/or the steps shown are confusing. Only the most basic mathematical symbols are used with accuracy.	The student shows <b>basic use</b> of mathematical language and/or forms of mathematical representation. The lines of reasoning are <b>difficult to follow</b> .
3-4	The working shown is generally adequate. Only a few errors in symbols/terminology are evident. It is reasonably easy to follow a student's logic/reasoning.	The student shows <b>sufficient use</b> of mathematical language and forms of mathematical representation. The lines of reasoning are <b>clear though not always logical or complete</b> . The student moves between different forms of representation with <b>some success</b> .
5-6	There are very few, if any, errors in symbols/terminology. All steps in calculations are shown in their completeness. It is easy to follow all the student's logic/reasoning.	The student shows <b>good use</b> of mathematical language and forms of mathematical representation. The lines of reasoning are <b>concise, logical and complete</b> . The student moves <b>effectively</b> between different forms of representation.

## Part A (Level 1-2 Questions)

Q1. Factorise **completely** the following expressions:

(a)  $x^2 - 16$

$(x - 8)(x + 2)$

Answer (a)  ~~$(x - 8)(x + 2)$~~  ✓

(b)  $x^2 - 16x$

Answer (b)  $(x - 8)(x + 2x)$  ✗

(c)  $x^2 - 16x - 36$

Answer (c)  $(x + 8)(x - 2x)$  ✗

Q2. Simplify the following expressions, giving your answers in the form  $a^n$ , where  $a$  and  $n$  are integers:

(a)  $3^5 \times 3^{-4}$

~~$3^5 \times 3$~~

Answer (a)  $3$  ✓

(b)  $2^4 \times 3^4$

Answer (b)  $1296$  ✗

(c)  $(6^2)^3$

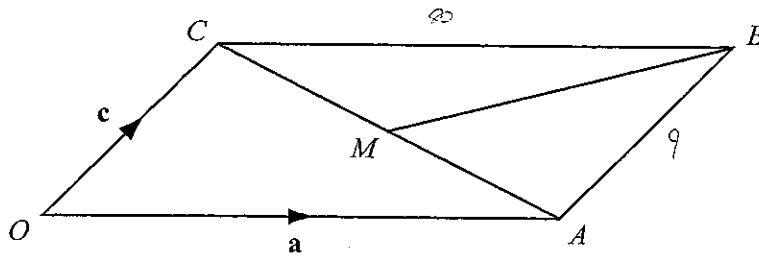
Answer (c)  $46656$  ✗

(d)  $16^2 \div 2^8$

Answer (d)  $4$  ✗

See question.

Q3.



OABC is a parallelogram.  $\overrightarrow{OA} = \mathbf{a}$ ,  $\overrightarrow{OC} = \mathbf{c}$  and M is the midpoint of CA. Find, in terms of  $\mathbf{a}$  and  $\mathbf{c}$ :

(a)  $\overrightarrow{OB}$

Answer (a)  $\underline{\underline{\mathbf{a} + \mathbf{c}}}$  ✓

(b)  $\overrightarrow{CA}$

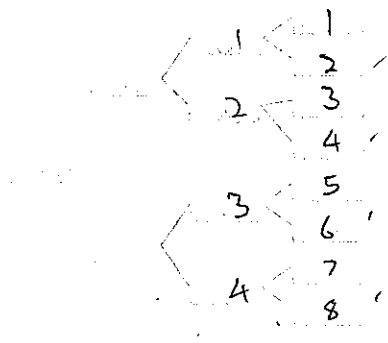
Answer (b)  $\underline{\underline{\mathbf{a} - \mathbf{c}}}$  ✓

(c)  $\overrightarrow{BM}$

Answer (c)  $\underline{\underline{(\mathbf{a} - \mathbf{c})/2}}$

### Part B (Level 3-4 Questions)

**Q4.** Eight teams take part in a basketball tournament. Each team is equally likely to win any particular game. Winning teams advance to the next stage. The losers go home!!



**(a)** Find the probability that all the even numbered team reach the quarter-finals (Q1, Q2, Q3, Q4).



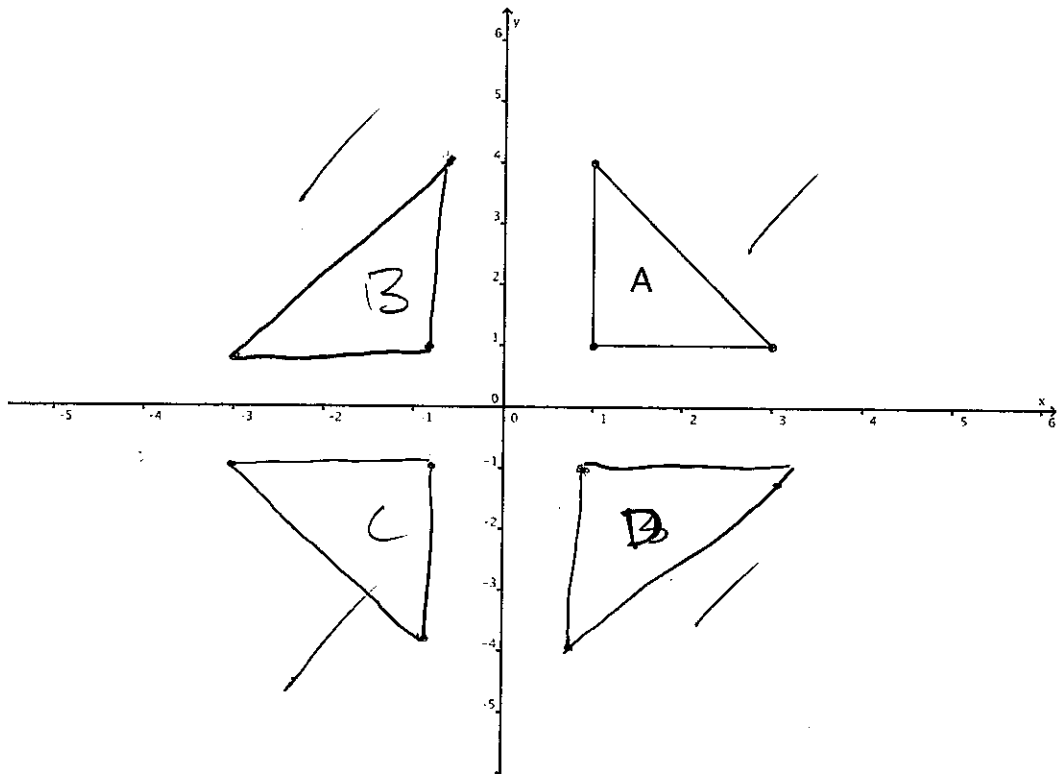
Answer (a) ..... 8:1 ..... ✓

**(b)** Find the probability that team 1 will play team 8 in the final.



Answer (b) ..... 8:2 ..... ✓

Q5. Triangle A is plotted on the Cartesian plane below.



- (a) On the same Cartesian plane above, draw the following:
- (i) Triangle A after it is translated by a translation vector  $\begin{pmatrix} -4 \\ 1 \end{pmatrix}$ , label it B.
  - (ii) Triangle C is the reflection of triangle B in the x-axis, draw triangle C.
  - (iii) Triangle D is the reflection of triangle A in the x-axis, draw triangle D.

(b) Describe the single transformation, which maps triangle C onto triangle D.

Triangle D is the reflection of triangle C in the y-axis.

Answer  $\begin{pmatrix} 4 \\ 1 \end{pmatrix}$

Q6. Erik runs a race at an average speed of  $x$  m/s.

His time is  $(3x - 9)$  seconds and the race distance is  $(2x^2 - 8)$  metres.

(a) Write down an equation in  $x$  and show that it simplifies to

$$x^2 - 9x + 8 = 0$$

$$x = \frac{9 \pm \sqrt{9^2 - 4 \times 1 \times 8}}{2 \times 1}$$

$$x = \frac{9 \pm 5}{2}$$

$$x = 0$$

(b) Solve  $x^2 - 9x + 8 = 0$

$$x = \frac{9 \pm \sqrt{9^2 - 4 \times 1 \times 8}}{2(1)}$$

$$x = \frac{18}{2(1)} \quad x = 0$$

Answer (b)  $x = 0$

(c) Write down Erik's time and the race distance.

$$(3x - 9) (2x^2 - 8)$$

$$(3 \times 0 - 9) (2 \times 0^2 - 8)$$

Answer (c) ~~24 time~~ ~~478 meters~~  $\frac{9}{8}$

### Part C (Level 5-6 Questions)

Q7. Solve the following equation for x:

$$2^{x+3} + 2^x = 36$$

~~$$2^{x+3} = 36 - 2^x$$~~

~~$$36 + 2^x = 2^{x+3}$$~~

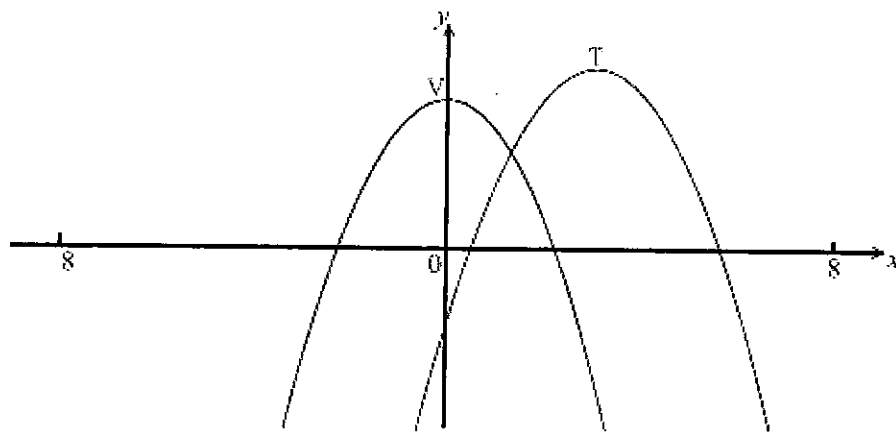
$$2^{4+0.5+3} = 19.5$$

$$2^{4+0.5} = 16.5$$

Answer  $19.5 + 16.5 = 36$

**Q8.** The following diagram shows part of the graph of  $f(x) = 5 - x^2$  with vertex  $V(0, 5)$ .

Its image  $y = g(x)$  after a translation with vector  $\begin{pmatrix} h \\ k \end{pmatrix}$  has vertex  $T(3, 6)$ .



**(a)** What are the value of  $h$  and  $k$ ?

Answer (a) .....

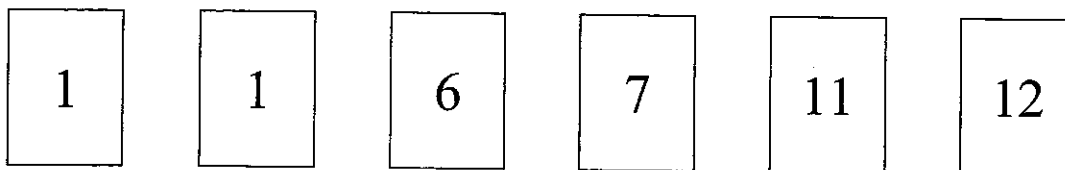
~~$\begin{pmatrix} 1 \\ 2 \end{pmatrix}$~~

**(b)** Write down an expression for  $g(x)$ .

Answer (b) .....

**(c)** On the same diagram, sketch the graph of  $y = g(-x)$ .

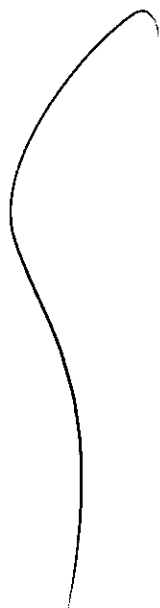
Q9.



Six cards are numbered 1, 1, 6, 7, 11 and 12 as shown.

Cards are chosen, without replacement, until a card numbered 1 is chosen.

Find the probability this happened **before** the fourth card is chose.



Answer 4 ÷ 1

#### Part D (Level 7-8 Questions)

**Q10.** Luis deposits a large sum of money in a bank account that pays 0.6% interest, compounded monthly. How long does it take Luis's money to grow by 10%?

$$0.6 \times 30 = 18$$



Answer 18 months



- Q11.** A cubical die is biased, so that some faces are more likely to show than others.  
The following table summarises the situation:

<b>Score</b>	1	2	3	4	5	6
<b>Probability</b>	$p^2$	$p^2$	$p$	$p/2$	0.03	0.05

- (a) Find the value of  $p$

~~0.01~~

Answer (a) ..... ~~0.01~~ ✓

- (b) What is the most likely score when you roll this biased die?

Answer (b) ..... 3 ✓

- (c) If you roll the die twice and add the scores, what is the probability the total is at least 10?

Answer (c) ..... ~~0.06~~ ✓ 0.03<sup>2</sup>

**NOW GO BACK AND CHECK YOUR WORK**

